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ABSTRACT

The first in a series on the relationship between the federal government and research universities, this report asserts that basic research is conducted in the public interest. Viewpoints of the government and the universities on accountability problems and issues are presented. Two types of accountability are considered: scientific, and financial and administrative. The methods currently used to attain these types are described. The disagreement on accountability is expressed by opposing contentions: (1) that university research administration is inadequate, and (2) that government procedures do not fit university research. Among the recommendations emeging from the study are that government and universities make concerted efforts to overcome the mutual suspicions and misunderstandings that have developed; that a new system of accountability be developed tailored to the nature of the activity and based on a set of minimum core requirements; that federal cost and management principles be revised as soon as possible; that funding agencies have an opportunity to comment on draft audit findings and final scientific reports; that simpler and less costly methods be developed for effort reporting; that university presidents review their financial management systems; that universities be delegated more budgeting authority; and that unnecessary restraints on the timing of expenditures be eliminated. Appended are a list of references and a list of university and agency "witnesses". (MSE)

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ACCOUNTABILITY:

Restoring the Quality of the Partnership

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NATIONAL COMMISSION ON RESEARCH
Accountability: Restoring the Quality of the Partnership

Executive Summary

For the better part of a half century, the Federal government and the research universities of the nation have been associated closely in the support and performance of research. Recently, this relationship has become strained. The partners have developed different views on the objectives of their association and the conditions of their collaboration.

The Commission

The National Commission on Research was formed in late 1978 as an independent body. It was sponsored by interested organizations and supported principally by private foundations. The Commission was charged to study the relationship between the government and the research universities, to determine the nature and origins of the problems afflicting the relationship, and to recommend ways to solve these problems. Additional information on the origins and purposes of the Commission is contained in the Foreword (p. ix).

Accountability

Many of the issues in dispute between the government and the research universities relate to increasing pressures for greater accountability for public resources. In this document, the Commission presents its view of the issues, states its conclusions, and suggests its recommendations concerning accountability in university research supported by the Federal government.

The Introduction (p. 1) asserts that this research is conducted in the public interest. It presents the viewpoint of the government and the universities on the accountability problems and issues. The section on purpose and scope (p. 5) provides definitions of accountability. Two principal types are discussed: scientific accountability, and financial and administrative accountability. The mechanisms currently used to attain these types are described. The nature and evidence section (p. 7) restates the accountability problems. The disagreement is expressed by opposing contentions. On the one hand, university research administrative practices are inadequate; on the other hand, government procedures do not fit university research. The nature of the problems is discussed in detail. This section concludes with a summary of the evidence gathered by the Commission.

Conclusions

The Commission derived several general conclusions from its study (p. 15).

First, there is no issue between the research universities and the government about the need for accountability for public resources expended in support of research. The issue is how that accountability is to be rendered.

Second, differences between the government and the universities over this issue have caused a deterioration of their relationship.

Third, the quality of the relationship must be restored on the basis of mutually understood and agreed upon principles and objectives.

Fourth, the universities must regulate themselves more effectively, and the government must reduce the detail and volume of its requirements so that the benefits exceed the costs of compliance.

Fifth, the universities and the government should seek agreement on a revised body of regulations. These revisions should produce a necessary and sufficient set of regulations which meet two standards: fully acceptable accountability and preservation of the research environment.

Finally, the management tools currently available to address these accountability problems are inadequate. New and alternative approaches are needed. Experiments to discover the best tools should be expanded and supported.

TEAR SHEET—EXECUTIVE SUMMARY REPEATED ON PAGE xi

Principles and Objectives

The Commission states two sets of fundamental principles which it believes guide the actions of the government and the universities. Major improvements in their relationship are only possible if each recognizes and understands the principles of the other. Within the framework of these principles, a set of mutual objectives for the government-universities research relationship then are defined. The recommendations of the Commission are based on these principles and objectives.

Recommendations

An explanation of each recommendation is contained in the full report (p. 19). The recommendations focus on three areas. Recommendation 1 provides for better understanding of the system by all the participants. Recommendations 2 through 6 deal with tailoring the accountability requirements to the nature of the research activity. Recommendations 7 through 11 provide means to increase flexibility and maintain accountability.

The Accountability recommendations of the National Commission on Research are:

1. The Commission recommends that research universities and the government make vigorous, concerted efforts to overcome the mutual suspicions, ignorance, and misunderstandings which strain their relationship and weaken the nation's research enterprise.

2a. The Commission recommends that research universities and the government develop a new system for accountability tailored to the nature of the activity being sponsored and based on a set of minimum core requirements applicable to all research agreements. The core requirements would be sufficient for all basic research and for some applied research; further requirements would be added only for activities of a pronounced procurement character.

2b. The Commission recommends that the Office of Management and Budget, in consultation with the federal agencies which sponsor research and the universities, revise the federal cost principles (Circular A-21) and the federal management principles (Circular A-110) as soon as possible, but certainly within three to five years. The revision should assure that these guidelines for financial and administrative accountability (1) incorporate features which not only control against abuse but also facilitate and encourage effective management, (2) are fully consistent with the nature of the research process, (3) accommodate better to the academic environment in which they must operate, and (4) are based on better mutual understanding of the purposes of the government-university research relationship.

3a. The Commission recommends, as a minimum, that the Office of Management and Budget institute new procedures to allow an opportunity for research funding agencies to comment on draft audit findings covering their university projects. This arrangement would be roughly parallel with current practices involving draft GAO management audit reports, and would provide relevant information for the audit agency.

3b. In addition to the above review, the Commission recommends, as an optimum, that agency program officers supplement their review of final scientific reports with advisory observations concerning the reasonableness, from a research standpoint, of the expenditures for personnel. The records of sponsoring agencies subsequently would be useful for the independent financial audits. This would link the technical review and the financial audit, an important linkage now missing.

4. The Commission recommends a simpler and less costly method of effort reporting based on responsible self-regulation: the explicit certification by individual investigators that direct salary charges to their research agreements are reasonable and fair, coupled with the federal program officer's review of the reasonableness of these expenditures for the work undertaken.

5. The Commission recommends that government agencies and universities construct an option, analogous to the "standard deduction" in income tax calculation, to charge activity which is treated as indirect costs under sponsored agreements. The fixed percentage would be negotiated. It might either be uniform or vary from institution to institution. Some universities would not receive full credit for their allowable indirect costs. However, accountability would be fully served and both government and universities would reduce the burden of detailed accounting and audit.

6. The Commission recommends that university presidents review their financial management systems. Universities should invest sufficient resources to ensure adequate control and accounting for the expenditure of research funds. These systems must provide timely and accurate financial information necessary for effective research management by research investigators. In turn, research investigators must meet the responsibilities and obligations which accompany their use of public funds.

7. The Commission recommends that the government and universities develop revised financial and scientific accountability processes which increase the flexibility and incentives for investigators to manage research funds in a scientifically prudent manner.

8. The Commission recommends that agencies delegate to the universities more authority to make budgeting and management decisions under sponsored agreements.

9. The Commission recommends that Congress authorize and agencies develop arrangements for aggregating individual research projects for administrative purposes.

10. The Commission recommends that government agencies improve the management of research funds by eliminating unnecessary constraints on the timing of expenditures. Specifically, the Commission recommends institutional authorization for pre-award expenditures up to 90 days prior to the effective date of awards and for carry-over of surpluses or deficits to the following contractual period, at least up to a specified percentage of the total award for that period. This involves no risk or commitment by the sponsoring agency.

11. The Commission recommends that Congress, the agencies, and the universities assure that the processes of accountability themselves meet the tests of accountability. The processes should yield results which justify their cost. One important application of this principle would be the elimination of the documentation now required by legislated cost-sharing on research grants.

A Forum

In addition to the recommendations related to accountability, the Commission hopes to initiate an evolution toward improvement (p. 27). It offers a preliminary suggestion of means for continuing improvement of the government-university research relationship:

> The Commission suggests the establishment of a new and independent Forum, as an experiment for five years. The Forum should provide a non-adversarial setting for persons from the public, Congress, universities, and federal agencies to watch over the government-university relationship and guide its evolution.

This suggestion is offered to stimulate ideas and discussion.

TEAR SHEET—EXECUTIVE SUMMARY REPEATED ON PAGE xi

ACCOUNTABILITY:

Restoring the Quality of the Partnership

National Commission on Research
March 1980

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Foreword

The National Commission on Research is a private, nonprofit organization established to examine the relationships between government agencies and universities involved in research and to develop specific recommendations for improvements. The Commission was founded in the latter half of 1978 by the American Council on Education, the American Council of Learned Societies, the Association of American Universities, the National Academy of Sciences, the National Association of State Universities and Land-Grant Colleges, and the Social Science Research Council. The Commission works independently of its founders to examine the process by which the federal government supports academic research and to propose changes designed to improve that process.

Funding has been obtained for Commission activities to pursue this task from the following organizations: Carnegie Corporation of New York, Exxon Education Foundation, Ford Foundation, The William and Flora Hewlett Foundation, the Andrew W. Mellon Foundation, and the National Science Foundation (Grant No. PRM-7903778 and CDP-7926386). Over four-fifths of the funding was made available by the five private agencies and approximately one-fifth from the public source. Any opinions, findings, conclusions, and recommendations expressed in this publication are the sole responsibility of the Commission and do not necessarily reflect the views of any of the aforementioned funding sources or founders.

This publication on accountability is the first in a series of documents to be developed by the Commission to analyze the process of government funding and university involvement in research and to make recommendations to all affected parties for improvements in the system. Subcommittees of the Commission are investigating each of the following issues:

(1) Accountability;
(2) Peer review and other selection processes;
(3) Alternative funding mechanisms;
(4) Industry/university/government relationships; and
(5) Development of research personnel.

Position papers on each topic will be published by the Commission.

The members of the Subcommittee on Accountability are Linda S. Wilson, Chairman; William D. Carey; Donald N. Langenberg; Irwin C. Lieb; Charles A. Mosher; and Raymond L. Orbach.

In addition to surveying the available literature, subcommittee members and staff meet with selected officials from business, government, and the universities. At monthly meetings, invited speakers present their views on pertinent aspects of the listed topics or on the broad purview of the Commission. The Commission has received testimony on four university campuses from faculty members and administrators, as well as written comments stemming from invitations to research universities and from an open letter in *Science* magazine. Liaison with numerous government agencies is maintained through telephone contacts, correspondence, and attendance at Commission meetings. Approximately one hundred fifty persons have given advice and information to assist the Commission in its study thus far. The Commission appreciates the efforts of all the participants in its deliberations and discussions. A description of these considerations and a partial list of individuals are contained in the Appendix.

The members of the Commission are listed inside the front cover. These individuals have backgrounds in education, business, and government. They have accepted appointments to serve on the Commission without compensation. During Commission deliberations, they reflect their own experience and not necessarily the viewpoints of their institutions or organizations.

Liaison persons have been designated to the Commission by the following government agencies: Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA); Department of Defense (DOD); Department of Energy (DOE); Department of Health, Education, and Welfare (DHEW); General Accounting Office (GAO); National Aeronautics and Space Administration (NASA); National Institutes of Health (NIH); National Science Foundation (NSF); Office of Management and Budget (OMB); and Office of Science and Technology Policy (OSTP).

In its series of publications, the Commission will review the key elements of the present state of federally supported university research, affirm what it believes to be good in this system, analyze problem areas, and provide suggestions for actions to alleviate these problems. The Commission recognizes that much diversity

exists in the complex relationships among principal investigators, research administrators and others in the university community, and program officers, auditors, administrators, and other government personnel. There is a wide range of beneficiaries, including industry, students, and the general public. The goals of the participating government organizations and educational institutions and of the concerned individuals involved in federally supported research are diverse and sometimes overlapping but not identical. Therefore, the Commission does not anticipate the ability to establish consensus on all of the issues. The Commission does seek to make a contribution to improved research in our nation by improving a system which produces a major portion of that research.

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This suggestion is offered to stimulate ideas and discussion.

Introduction

Research in the Public Interest

Research is performed by universities and supported by the Federal government because it is in the public interest to do so. The national research enterprise reflects a confluence of the purposes of the government and the research universities.

The purposes of the government and the universities overlap in the research enterprise, but the purposes of the two sides are not identical: the government and the universities each have other purposes which enhance the public interest. The government exists to assure public security and well-being. It pursues public policies principally through taxation, spending, and regulation. The universities exist to discover new knowledge and to preserve and disseminate knowledge through a triad of teaching, research, and service. These purposes also advance the public interest.

Research universities and the government share some important characteristics. Both are highly complex, evolving, and diverse institutions with limited resources and with some of their own goals in conflict. Both have limits to their success in achieving their purposes. Both have individuals in positions of leadership and responsibility who hold a wide variety of views on the proper relationship between the government and the universities. Both induce and respond to changing social expectations. These characteristics are typically American, sometimes immutable, and often more desirable than potential alternatives. Despite these similarities, there are deeply rooted institutional differences. These differences have been the major contributors to the disturbing deterioration of the government-university research relationship. Each partner in this research relationship is having difficulties with the actions and policies of the other. Attainment of the public interest in the conduct of research by universities with federal funds is deteriorating. The situation cannot be allowed to drift from bad to worse. The aim of the National Commission on Research is to propose actions and policies to reduce the difficulties which are damaging the research process.

The General Problem

A central issue in the government-university research relationship is accountability. Observers express the problem in widely varied terms. The following statements attempt to capture the main themes of the perspectives of the public, the government, and the research universities.

The problem for the *public* is to ensure that the best research is produced and that public funds are not wasted or abused. The problem for the *government* is to attain fully its program purposes and to fulfill its stewardship responsibilities. The problem for the *universities* is to conduct research well, to avoid diversion of resources to meet unnecessary administrative requirements, and to protect the integrity of their operations. Both the universities and the government seek to maintain public confidence, because support for their activities depends on it.

Specific Issues for the Government

Stewardship

Government officials have repeatedly stated that federal auditors are unable to review, to their standards and in a manner satisfactory to them, some university records for federal awards. They criticize both the accounting practices of universities and the management of federally supported research by university administrators and principal investigators. Many government leaders believe that in order to carry out their own stewardship responsibilities they must alter current university management and accounting practice.

Intervention

Critics have accused the Federal government of intruding excessively into university management and in some cases undermining their freedom and their capacity for effective pursuit of new knowledge. Opponents of this view state that the government actions being criticized are necessary for proper federal stewardship.

Resource Allocation

The government annually allocates public funds in the budget process to many competing uses. When a class of uses such as university research is criticized as lacking in accountability, it may suffer in this resource allocation. This is particularly true when general economic conditions extraneous to the program purpose create pressures for restrained spending. Research programs are always discretionary, and thus bear a disporportionate share of this pressure. In order to stretch funds further, everyone seeks to avoid fraud, abuse, and waste. The lack of expanding resources creates problems for the research advocates in the government, while it gives additional influence to opponents of expanded government support of research.

Diversion

Administrative practices under federal programs have been criticized on the basis that universities divert funds from targeted federal program purposes to support more general research or other university activities. While opinions in the Congress and the Executive Branch vary, the present dominant policy thrust is to emphasize specific program purpose (e.g., application of new energy technology or a new treatment of a disease) over more general purpose (e.g., basic physical characteristics of non-fossil fuels or molecular biology). This can create an inherent government bias against basic research and against programs of general support for universities. Some government leaders recognize the high value of public investment in both basic research and the general well-being of the university research community. This group includes President Carter and President Ford. With some success, these leaders fight an uphill battle for greater federal support for research.

Debate over general support versus specific application is likely to remain a permanent feature of the government-university research relationship. It results in some situations where federal support is offered on terms not fully acceptable to the universities. As in any negotiation, both parties seek to maintain their fundamental objectives. That is, the government seeks strict interpretation of the program purpose and its administrative rules, while the universities seek broad interpretation of the program purpose and flexible application of administrative rules. This fundamental incongruity of expectation creates problems for both sides and is compounded by the fact that expectations also vary within the government and within the universities. A broad interpretation of program purpose which may seem legitimate to some is called fraud or abuse or an audit exception by others. A narrow interpretation may seem to contradict the underlying basis for agreement, i.e., support of research. The government problem is to administer programs in light of these differences of view.

Public Confidence

This issue affects both the universities and the government. When the general public receives reports of alleged wrongdoing, support for university research activity is diminished. This diminution is manifest both specifically in calls for reduced spending in research programs and generally in an anti-government attitude which makes government objectives more difficult to attain.

Specific Issues for the Universities

Criticism for Poor Management

In recent years government auditors have repeatedly criticized the ways universities operate and account for federal research support. Practices once accepted are now rejected as inadequate. University officials and principal investigators are called bad managers or worse. Given the subjective judgment and long time horizon necessary to evaluate the outcome of research, evaluation often focuses on the easily quantifiable elements of the process, principally time and money. On the other hand, university researchers believe that they are correct to give strong emphasis to the outcome of research, albeit difficult to measure. They tend to evaluate their own performance as managers on the outcome. They are concerned when external reviewers seem to focus only on the so-called input and the processes and then conclude that the universities are poorly managed. They find some of the costing and management standards provided by the government to be distorting, disruptive, and unfocused. They are understandably reluctant to abandon their own practices in favor of other methods which do not have the same objectives.

Reduction of Research

Economic pressures cited above under *Resource Allocation* in combination with declining enrollment forecasts place university research in a difficult financial squeeze. This situation is further tightened by the increasing diversion of federal support and university resources to administrative tasks associated with accountability. A new payroll or accounting system consumes funds which otherwise could be used directly in the laboratory. Although the trend may now be reversing, the annual level of federal support for basic research has declined in real dollar terms for almost ten years. U.S. scientists are particularly concerned about increased investment and success of other nations in science. The period of American dominance in most of these high-technology fields is at an end. The liberal arts and humanities are experiencing a very difficult period of diminished resources and weaker employment prospects for graduates and faculty alike. Because research functions in the university environment like capital investment functions in an industrial setting, some alarmed university leaders foresee a generation of problems resulting from present levels of research spending.

While some of this could be altered by raising federal spending, a significant portion of the downward pressure on resources is due to increased administrative requirements. Principal investigators are drawn away from research into complex and time consuming managerial activities which they view as irrelevant to conducting sound research. Criticism of effectiveness of the administration of research tends to depress budgets for research. Attempts to improve administration divert funds and effort from direct research. This cycle feeds on itself.

Reduced Flexibility

Universities carry out teaching, research, and service as an integrated whole, not as separate functions. This underlies the university perspective on the government issue discussed above under *Diversion*. In the United States there is a strong current belief as well as long tradition that each function is done best through the integrated approach and that separation would diminish each and seriously damage the institution. Federal programs are usually designed to support only one of these functions, although the value of byproducts and the long-term investment requirements involved are often recognized. Federal officials striving to obtain the most and the best research with limited funds available want to avoid unintended support of anything else. Universities do not accept the auditors' view that any multi-product process can have an exact cost properly allocated to each of the products. Accuracy is considered elusive and prohibitively expensive. Many researchers believe that the flexibility vital to their creative role is reduced by government requirements for highly structured planning and accounting. They do not believe their loss of flexibility is justified by the value of the level of accuracy required. Such levels are seen by many university investigators and administrators as excessive, distorting, and purposeless.

The character of the project grant system of distributing government research support will be discussed at length in subsequent publications of the Commission. One principal characteristic of this system is that investigators often must package multiple sources of funds to support a coherent research program. Each source has its own rules and purposes. The investigator may grasp the distinctions among them, but his main focus is on the research itself. Some of these distinctions may seem arbitrary and unnecessary to the investigator.

The requirement to account separately for each award creates an artificial separation. Such segregation leads to cost transfers between projects. Cost transfers cause difficulties with audits. Making distinctions between research and teaching causes disagreements between universities and auditors over time and effort reporting. General requirements for advance planning of highly speculative research events and adherence of record keeping systems to an external and sometimes poorly suited accounting standard cause serious loss of flexibility for university researchers. Many observers believe that this represents a sizeable and unwise diversion of dollar resources and an erosive effect on the creativity vital to the research process.

Public Confidence

As stated above, both the government and the universities are affected if they lose public confidence. The problems for the university community are several. State institutions can lose state funds. Both state and private universities can lose private sources of funds. The quality and performance of the faculty and the students can be eroded. To flourish, university research needs the support and confidence of the public. These problems can diminish that support and thus weaken the research process.

Improvement of the Relationship

In October 1978, an independent National Commission on Research was created to study the government-university research relationship and to recommend ways to improve it. In its study on accountability, the Commission obtained the views of a wide range of government and university officials and reviewed many documents and studies. The gathering of new data or replication of previous investigation was beyond the Commission's resources. Instead the Commission used wide consultations and available materials to develop its views on accountability and to formulate principles and objectives which might serve as a framework for their resolution. Early in the study the Commission became convinced—and that conviction was reinforced throughout—that *there is no issue between the universities and the government about the need for accountability. The issue is how accountability is to be rendered.*

This report describes the purpose and scope of accountability, the mechanisms now used to provide it, the problems that have arisen concerning it, and the conclusions the Commission has drawn from its study. It states the fundamental principles deemed essential by the parties in the government-university relationship and sets forth objectives for the relationship which are consistent with these principles. Finally, the report presents recommendations of the Commission for ameliorating the problems in accountability.

Since the government's major funding for research is for work in the physical and life sciences, the report refers often to "scientists." The issues described, however, are equally troubling to humanists, engineers, and social scientists.

Purpose and Scope of Accountability

Accountability means being responsible and assuring that actions are taken and resources are managed with proper regard for the rights of others. Accountability can be achieved through systems of checks and balances, through independent reviews, and through structuring relationships so that consequences depend on certain norms of behavior.

In academic research, scientists and scholars are accountable not only to the governing bodies of their institutions, but also to their profession, which demands disclosure, proof, replication, and rigorous intellectual honesty. When public funds are involved in the support of research there is a further accountability required, not only on the part of those conducting the research, but also on the part of those responsible for the allocation of funds. Executive Branch officials must be able to justify to the Congress and to the general public the choice of research to be supported, the selection of the research performers, the quality of the research performed, and the propriety of the expenditures involved.

There are various forms of accountability: for *financial and administrative* accountability the focus is on evidence of financial propriety and regularity and compliance with administrative requirements; for *scientific* (or programmatic) accountability* the issue is achievement of results or progress toward proposed scientific objectives; for *social* accountability the issue is the extent to which specific social goals have been fulfilled in the performance of research.

The Commission worked principally on scientific accountability and financial and administrative accountability.

There are also different modes of accountability: in *performance* accountability the emphasis is on outcome; for *process* accountability the focus is on the procedures or methods used. Process accountability serves as a surrogate for performance accountability when outcome or progress is difficult to evaluate. Overall accountability is a mixture of these various aspects. When well designed, the system of accountability involves an appropriate balance between independence and control, between incentives and constraints, and between the costs and benefits of the various procedures and requirements used.

Mechanisms of Accountability

Scientific Accountability

Several mechanisms are used to provide accountability for research in universities. Researchers are accountable to themselves, to their peers, and to their universities. They also provide accounts of their work in their publications. The ethics of science is based on settled principles of disclosure, proof, and replication. Science, like other areas of scholarship, demands integrity. Deviation from these norms carries a heavy professional penalty. The peers of scientists and other scholars judge the soundness and value of their research results. Peers play a major role in deciding what science will be supported and thereby influence what kind of science will be done. They also participate in the selection of the research to be published in scholarly journals. The quantity and quality of research published by the faculty in research universities is a major factor in their recruitment, promotion, tenure, and continuing performance evaluation. These forms of peer and institutional accountability occur whether or not the research is supported by the government.

Researchers also render an accounting on the substance of their sponsored research to their sponsoring agencies by way of technical reports. Such reports may be incorporated in proposals for future support or may be provided separately. Proposals found wanting in the report of research accomplished with previous support fail in the competition for additional funding In some areas the competition for support is so strong that many proposals of very high quality cannot be funded. For these areas the review of scientific accountability is especially severe. The nature of the technical report required and the care with which such reports are reviewed vary by sponsoring agency and also by type of research involved.

Scientists are also accountable, in general, to society at large. In some specific areas, scientists' accountability to the public takes place through public participation in review of research to be undertaken, as in lay membership on committees responsible for review of the use of human subjects and lay membership in governmental advisory councils.

*Since most of the work sponsored by federal agencies at universities is in fields of science, the term "scientific accountability" will be used instead of "programmatic accountability."

Financial and Administrative Accountability

The goal of financial and administrative accountability is the assurance that funds are spent in accordance with the terms of the research agreement, without diversion, waste, or fraud. Some issues are: the bearing of the expenditures to the purpose of the award, management effectiveness, economy and efficiency, including the stewardship of resources, and the integrity of financial operations. Additional expectations are for fair and ethical practices, proper locus of control, compliance with applicable laws and regulations, prudent scientific management, and a reasonable and equitable apportionment of costs in joint activities.

Financial and administrative accountability is implemented through the expectations and requirements of the sponsor, incentives and information, checks and balances in the operating systems of both parties to a research agreement, and subsequent reviews of expenditures and operations. The expectations and requirements of the sponsor are set out in several ways. The parties have a general understanding of the scope and purpose of their association, and of the general rules which apply to all agreements of the kind that they have made. In the government-university partnership, these include the cost principles (OMB Circular A-21), the management standards (OMB Circular A-110), and, for contracts, the standard procurement regulations. Specific rules apply on an agency by agency basis as defined in the agency grants administration manual. Each agreement also may include specifically designed and unique terms and conditions.

For a university to provide financial and administrative accountability, all the concerned persons in a university must know the expectations and constraints of the research agreement. Research investigators must recognize the limitations specified and implied by their grants and contracts and must have accurate and timely information on the financial status of their project accounts. Institutions must have accounting systems which enable them to keep effective records of agreements which have different terms and contractual periods and which enable them to assign costs on a sound and logical basis. Their financial management systems must control access to funds and provide independent review of decisions in order to avoid conflicts of interest or temptations for illegitimate personal or institutional gain. Audits of these systems by independent public accountants or state officials must test the general financial integrity of transactions and reports. For restricted funds, they must test also for the institution's compliance with the intentions of their sponsors and donors.

Current federal policy provides for federal audits to review systematically or to appraise whether: financial operations are properly conducted and financial reports are presented fairly; applicable laws and regulations have been followed; resources are managed in an effective manner; and desired results and objectives are being achieved in an effective manner. Federal policy also stipulates that the scope of federal audits is to be tailored to each specific program, to the management need to be met, and to the capacity of audit facilities.

Financial and administrative accountability also can be fostered by arranging incentives for prudent and productive management and through developing guidelines and optimal information for management purposes. Effective accountability mechanisms should encourage and facilitate good management as well as control against abuse.

Nature and Evidence of Accountability Problems

Restatement of the Problem of Accountability

There is no disagreement over the need for accountability. The basic disagreement between the government and the universities over accountability is how accountability is to be rendered. This disagreement is expressed in two opposing contentions: on one hand, that university accounting systems are inadequate for stewardship of public funds and, on the other, that government procedures do not appropriately allow for the conditions required to discover new knowledge or for the multi-product nature of the activities in research universities.

The Context of the Problem

These concerns arise in the context of the life cycle of research agreements which has three primary stages: (1) the selection of research to be supported, (2) the conduct of the research, and (3) the reporting of research results and accounting for resources. Different facets of accountability and different participants are involved in each of these stages. The operating understandings and procedures of one stage do not always interact constructively with those of another stage.

For example, detailed research proposals which may be useful in choosing among projects which all meet a high standard can become a straitjacket if followed strictly in the conduct of science. The project grant system funds individual projects rather than broad programs of research. This enhances the selection of research to be supported but complicates its administration and can impede the coordination of closely related lines of inquiry. This narrow compartmentalization of federally supported research is inconsistent with research practice. The normal activities of the university investigator integrate research, teaching, and service; and these activities often intertwine multiple research projects.

Major Areas of Concern

The major areas of contention are (1) the use of federal funds for intended purposes, (2) the nature and extent of documentation necessary to validate expenditures, and (3) the systems and controls required for management of resources.

Recent government audits of federal grants and contracts at colleges and universities repeatedly have cited documentation practices which the auditors find inadequate to verify the charges. Particular focus has centered on the dissatisfaction of the auditors with the system to document charges for salaries and wages, the "effort reporting problem." Other problems have involved inadequate documentation of cost sharing, undocumented consultant costs, and improper and undocumented cost transfers. The auditors have found deficiencies in some university management systems, such as those for cash management and for acquisition, control, and accountability for equipment and supplies. Improper charges are cited less frequently but include overcharges of fringe benefits, summer salaries charged at a rate in excess of a prescribed base, tax-exempt stipends charged as salaries, and improper cost transfers.

Government officials also contend that institutions are inordinately slow in making changes in their financial management systems to comply with changed standards set by the government.

Some government officials and auditors contend that investigators and institutions have allowed diversion of federal funds from one project to another or to unsponsored institutional activities. Recently, two individuals have charged that institutions have used grant monies to pay for salaries and other costs unrelated to the purpose of the grants. From time to time, cases of fraud have emerged.

In 1979 the DHEW Office of the Inspector General issued its annual report[1] based on DHEW audits of $1.5 billion in grants and contracts with educational institutions. As a result of deficiencies cited by the auditors in these universities' systems of accounting, the auditors were unable to determine to their satisfaction whether $86.5 million, or approximately 5.7 percent of the expenditures reviewed, had been properly charged. The Inspector General's report pointed out that this did *not* mean that these expenditures were illegal or improper, but simply that they could not be audited under existing regulations and thus must be adjudicated. In addition, about $3.5 million in expenditures, approximately 0.23 percent of the total reviewed, were reported as not properly charged. Most of these problems were caused by deficiencies in the institutions' salary and wage documentation systems or were the result of inadequately supported or improper cost transfers.

Two recent GAO reports [2,3] based on examination of a sample of institutions, state that college and university accounting systems are inadequate for verification of the allowability of costs charged to federal grants and contracts.

It should be noted that the DHEW Inspector General report describes audit findings presented in DHEW audit reports. Such findings are not necessarily sustained through the subsequent steps of institutional response and resolution of any remaining differences. However, it is the Commission's view that even if the institutions' positions were sustained in a significant proportion of the cases, the fact that $86.5 million were deemed to be unauditable indicates a very serious lack of agreement about appropriate documentation standards.

The universities contend that cases of fraud and cases where government funds have been used to support unfunded activities are rare. They agree that such practice is improper and cannot be condoned. Fraud evokes stern institutional sanctions. The universities believe that by and large the systems used by higher education do provide reasonable assurance that federal funds are used as intended, especially given the fact that a major research university typically has more than a thousand different government projects, each represented by a separate grant or contract to which costs are assigned. The universities are worried about what they perceive to be increasing emphasis on fiscal and administrative accountability without due regard for the scientific accountability provided in peer reviews, program reviews, and technical reports.

The universities point to an escalation in the documentation standards imposed by auditors without following regular processes for negotiation and promulgation of new standards. They contend that there has been retroactive application of new standards. The universities disagree with the escalation of documentation requirements and the all too frequent implication that lack of detailed documentation is evidence of abuse. The universities warn that some of the documentation and management standards can be incompatible and even counterproductive. This is particularly true if the standards are applied in an inflexible and heavy-handed way in the context of research in an academic environment. In addition, the universities have noted a marked inconsistency between the strictness of the auditors' expectation and the flexibility of management accepted and encouraged by government program officers who are focused on increasing the effectiveness of the federally supported research.

The universities chafe at what they believe is overemphasis on accounting precision, uniformity, and unrealistic expectations about the validity of certain accountability procedures, notably effort reporting. They are concerned about the continuing lack of recognition or reimbursement of certain kinds of research costs borne by them. They also question the validity and fairness of certain audit practices, for example, certain sampling procedures, and have some doubt about the integrity of the audit resolution process.

Individual investigators, program officers, and congressmen have voiced concerns about rising indirect costs, while universities lament the spiraling energy costs and escalating administrative requirements which cause increases in indirect costs.

The numerous concerns identified above contribute to rising tensions and threaten a relationship which for many years has been fruitful beyond measure. Through the government-university research collaboration knowledge has grown, research results have been widely and usefully applied, and both the government and the universities have been able to serve society better than either could have done on its own.

In his Science and Technology Message to Congress of March 1979,[4] President Jimmy Carter expressed his concern for the partnership between the Federal government and universities:

> The partnership . . . needs renewed attention. Many leaders of university research centers believe the government has intervened too deeply in university affairs, to the point of affecting institutional independence and diversity. The problem stems from the need to ensure accountability of research funds. On the one hand, accountability is important to me, to Congress, and to the taxpayers; we must improve the government's ability to manage and account for public funds. On the other hand, it is equally important that the pendulum not swing so far that we stifle progress. We must allow flexibility both for the government agencies and for the research institutions. We should not confuse excess paperwork with proper accountability. . . . It is clear . . . that our partnership with universities needs further strengthening. We must continue to experiment with new approaches.

Shortly afterwards, the Comptroller General of the United States acknowledged the strains in the government-university partnership and suggested that steps be taken to ease them.[5] Comptroller General Staats emphasized the need for strong accountability but acknowledged that precise, uniformly categorized accounting systems may not be appropriate for university research. He defined the key issue as how to assure appropriate stewardship for funds spent in support of research, without imposing excessive controls, direction, and administrative burden on research grantees.

The National Commission on Research has tried to explore carefully the various views of government and university participants and to develop a fair and objective assessment of the problems. Unfortunately, some of

the reporting of the problems in the popular media has presented information out of context and without balance. The result of imbalanced reporting on this matter can be dangerous, since in effect such reporting is an attack on research scientists and the universities. Unnecessarily undermining the public's confidence in research and research institutions complicates the government's carrying out of national research support policies and will ultimately damage the public welfare.

In the following section the Commission reports on the origin of the accountability problems. Without appreciation of the factors which lead to the problems, workable solutions cannot be developed. Nor can responsibility be fairly assigned.

Origins of the Problem

Historical Developments

A number of significant changes have affected the evolution of the government-university relationship and contributed directly and indirectly to the development of the present problems over accountability. The character of the relationship itself has changed over the last forty years. In the early years relatively few researchers applied for federal support and few agencies and institutions were involved; the range of research topics was limited, and the community of researchers was small. Major researchers were often well known to each other and to the agencies. Proposals and budgets were not extensively detailed. In any one institution the number of externally supported research agreements was quite small. Administrative requirements were few and simple.

In contrast, there are now over one hundred research universities, thousands of investigators, large numbers of associated research personnel, numerous sponsoring agencies, and hundreds of different federal programs. Funds for research have multiplied manyfold. Institutions for formulating research policy, for assessing research proposals, and for administering research awards have grown in size and complexity. Administrative requirements have mushroomed. The number of individual research agreements in major research universities now lies in the range of five hundred to five thousand per university per year. What was a small, relatively simple, and intimate relationship has evolved into a very large, complex, and sophisticated enterprise.

As the enterprise grew, various modifications were made. For example, in the late 1960s audit responsibility for all research agreements at a given institution was consolidated under a single cognizant agency; most educational institutions were assigned to DHEW. This change was designed to relieve the problem of multiple audits by different agencies at the same institution. One consequence of this change, however, has been a decoupling of financial and administrative accountability from scientific accountability. This decoupling detracts from overall accountability.

The nature of federal support for research also has changed over the years. In the continuum between broad and categorical purposes, the balance has shifted markedly toward the categorical. Federal investment in higher education also has shifted toward support to individuals rather than to institutions.

The institutions in the research university community also have changed substantially over this period, in size, in complexity, in emphasis on research, and in extent of participation in the government-university research relationship. Over this period an interdependence between the government and universities has developed as they have cooperated in pursuit of knowledge for the public welfare. This relationship has been extraordinarily fruitful in scientific achievement.

The government-university relationship also has been affected by a significant change in resource climate. Current and persistent economic difficulties severely burden individuals, the universities, and the government.

These factors introduce strains in a relationship which is particularly vulnerable to strain for two reasons. First, the relationship is a composite of many individual relationships and few participants perceive the whole picture. Second, the nature and operating methods of the two partners are quite different. Consequently, there can easily develop a serious mismatch of expectations.

Process and Organization Differences

Processes effective for a production enterprise with a hierarchical organization are not necessarily transferable to other environments. Considerable adaptation of these processes is required if they are to work well in an environment where the mission is discovery—not production—and where individual investigators operate rather independently. Power, authority, and research direction in universities do not flow from the top down. University processes are quite decentralized and depend heavily on the judgment of peers. Intellectual curiosity and independence are prime motivators for faculty. University structures purposely are designed to encourage

individual creativity and fresh approaches to problems. Federal support for research and development in universities is conveyed through grants and contracts with the university and the government as the formally contracting partners. But for most of these agreements the principal actor is the individual faculty member who either originates the research project or responds to a government request for a proposal to accomplish an objective set by the government. This relative autonomy of the faculty is not accidental; it is designed to avoid blind orthodoxy by the government or academicians, to encourage initiative, and to allow selection of the most promising individuals and ideas for support. Repeated evaluations of this project system of support during the last twenty-five years have affirmed the wisdom of this approach. But this autonomy does not always lend itself to the management processes developed for more hierarchical organizational structures. Indeed, some such processes are perceived as threats to the organization. The decentralized character of a university makes effective imposition of administrative regimentation difficult. The fragmentation necessitated by project grants compounds the problem. Management processes must accommodate to these structural characteristics.*

Distribution of Faculty Effort

Some of the difficulties involved in documenting faculty effort on externally sponsored projects can be traced to the assumption that faculty activity can be distributed without fundamental distortion. The university is very much a "mixed product" environment, where one particular activity often falls under several headings and where research, teaching, and service are meant to be so closely entwined that they cannot be disentangled. In such an environment, any documentation of faculty effort inherently will be imprecise, and even damaging if it forces artificial separations of functions. Another major source of difficulty is the fact that in universities there is no standard work week for professional personnel; time and effort are not the performance measures for these employees. They function on a work assignment basis and are evaluated on the basis of their performance, not the time or effort they spend.

Diversity of Institutions

The diversity among institutions is a valued national asset, but it contributes to the problem of developing uniform standards or procedures which are effective and equitable. Differences between public and private institutions, differences among states in the way public institutions are funded and managed, differences in traditions, organizational philosophies and priorities all affect the management structures and strategies used by universities. For all but a handful of these institutions, the federal research and development support, though it may be sizeable in absolute magnitude, is less than one-third of the total institutional budget. As such it cannot unilaterally determine the design of the management system for the institution. This fact is often overlooked in the design of the federal requirements for financial and administrative accountability.

Design of the Research Support System

Cost transfer problems are partly due to the conflicting expectations of auditors and agency project officers. The latter often focus on the scientific reason for a transfer and the ways projects are related, while auditors seek clean segregation of the costs of separate projects. These differences reflect differing interpretations of the principle of allocability stated in OMB Circular A-21. The cost transfer problem is also a result of the design of the support system. Support for research is received in multiple, discrete project awards of limited duration. Cost transfers are a direct consequence of this method of support, especially in cases where an individual investigator's overall program of research is funded from several sources so that some costs may be assigned as legitimately to one source as to another. Prudent management of the resources available to the investigator may dictate some legitimate but retroactive reallocation of charges, resulting in cost transfers.

Financial auditors have difficulty judging the reasonableness of such transfers. They begin with the assumption that all cost transfers are suspect and expect explicit documentation of their validity and justifiability. However, such documentation of cost transfers for each transaction is quite burdensome. An alternative approach is needed so that legitimate and illegitimate cost transfers can be distinguished without burdening the investigator with unnecessary documentation requirements.

*The mechanisms for federal support of research and the assurance of quality are the subjects of separate studies by the National Commission on Research and will be treated in separate reports.

Late Arrival of Award Notices

The commonplace late arrival of award notices generates additional cost transfers because institutions frequently must draw upon internal accounts to initiate purchase orders and appointments to avoid serious delays or a hiatus in the work. Subsequent transfers to correct the charges once the award is received arouse suspicions of auditors. If not well documented they are subject to disallowance. Unauthorized diversion of government support for purposes genuinely outside the scope of the support agreement is, of course, improper. The basic problem is to distinguish proper from improper cost transfers without overburdening the system with documentation requirements or rigid rules, and to correct the flaws in the system which provoke cost transfers.

Increasing Specificity of Proposals

The trend toward increasing specificity in proposals for support of research adds to the cost transfer problem. Perhaps more importantly, it also leads to increasingly conservative approaches to research. In the review of basic research proposals, specificity can be useful for assessing the investigator's intellectual acumen. But if the investigator must adhere in detail to the proposal, it becomes a straitjacket, and it can stifle creativity and the pursuit of the unexpected results. Rigorous hewing to performance specifications may be appropriate for work under some procurement arrangements, but it is inappropriate for most basic research. A clearer understanding of the nature of research is needed, along with a greater congruence between the government and university expectations of the proper level of specificity.

Concern About Indirect Costs

The perception of a widespread accountability problem seems to have a relatively recent origin. Prior to 1970, audit problems occurred, but in what appeared to be isolated instances. More concentrated attention on matters of accountability can be traced to a noticeable increase in the indirect cost rates of colleges and universities beginning roughly a decade ago. Indirect costs are not well understood and are a source of considerable strife, both within government and within the universities. This is true even though indirect costs are based on a standard approach widely accepted by the accounting profession for allocating costs to joint activities. They are derived according to federal cost principles (OMB Circular A-21). Congressional concern that rising indirect cost rates were diverting resources from approved research led to increased audit scrutiny. Institutional practices which had been found quite acceptable in previous audits began to be questioned and criticized. In response, universities analyzed and explained the reasons for the rise in their indirect cost rates. DHEW, the agency responsible for auditing most colleges and universities, drafted a proposed revision of the cost principles designed to eliminate or limit the reimbursement of certain kinds of costs and to tighten the procedures required for documenting and allocating costs. Extensive discussions between DHEW and the universities ensued, culminating in their submission of separate proposals to the Office of Management and Budget. The revised principles issued by OMB in March 1979 were developed after extensive consultation with both university and federal agency representatives, but they are unlikely to bring full resolution of the difficulties.

The continuing disagreement derives primarily from the erosion of a mutual but largely unwritten understanding of the basic nature of the government-university relationship in support of research. Until this understanding is repaired, efforts to come to agreement on a set of cost principles are doomed to failure because the cost principles are merely a tool to implement the relationship. Under perceived congressional pressure for demonstrable action to improve financial accountability, OMB issued the revised cost principles. This postponed addressing the more fundamental and much larger problems.

Evidence of the Deteriorating Relationship

The evidence that the discovery process is being undermined by poorly fitting requirements for financial and administrative accountability is largely descriptive and impressionistic. It is exceedingly difficult to document with any precision the costs of lost opportunity, motivation, or morale. The Commission has interviewed many researchers and administrators from both the government and the universities during its brief tenure. On the basis of these discussions the Commission has no doubt that a substantial problem currently exists and that any further tightening of the requirements will only exacerbate the problem. The Commission also reviewed materials developed by others on this matter. A sampling of these materials is described briefly below. The resource and time constraints of the Commission limited it to this approach.

Previous Studies

Smith and Karlesky, in their book *The State of Academic Science*,[6] have described concern about the "subtle extension of inflexible controls that limit individual researchers' freedom of action" which they discovered in site visits to six departments in each of thirty-six universities. Additional evidence of faculty concern lies in the results of a survey of twenty-four departments granting the Ph.D. in chemistry, undertaken as part of the work of the Task Group on Accountability in Research of the National Science Foundation Advisory Council.[7] Three-fourths of the respondents believed that some of the regulations imposed to assure accountability are detrimental to research and identified one or more of the following as detrimental in their present form: financial accounting requirements, effort reporting, safety regulations, prior approval requirements, human subjects and animal care regulations, excessive reporting for one-year contracts, and "mindless" adherence to the original proposal.

In 1977 the National Science Foundation's Division of Policy Research and Analysis issued a report[8] entitled *The Effects of Federal Regulations on Colleges and Universities*. This report concluded that while the number and complexity of government regulations affecting colleges and universities have increased significantly in the last decade, there has been little empirical research as to the impact, cost, or effectiveness of the regulations.

Also in 1977 the Sloan Commission on Government and Higher Education invited twenty-one colleges and universities to examine the impact of the Federal government on them, each in its own way. A summary of the individual institutional self-study reports[9] reveals considerable concern about the government-university relationship, particularly with respect to the effort reporting burden and its incompatibility with educational institutions and the research process. There also was widespread concern about reporting requirements and the methods used for enforcement of regulations with fiscal purposes and with social purposes.

An example of this last concern is the regulations for research on human subjects. DHEW, EPA, DOE, FDA, the Consumer Product Commission, and the separate branches of DOD each have separate rules or regulations for the protection of human subjects. The National Commission for the Protection of Human Subjects acknowledged the burden of multiple rules and recommended that the responsibility for human subjects protection be delegated to a single agency, but such consolidation has not been accomplished. Institutional concerns include the high costs of the prescribed review procedures, inappropriately broad applicability of the regulations, unnecessary interference with legitimate research, delays, and threats to academic freedom.

The 1977 report[10] of the Commission on Federal Paperwork included a section on the paperwork burdens imposed upon the education community, particularly with respect to research grants and contracts. The report estimated that, if implemented, its recommendations could result in net savings of more than $190 million. The problems identified as most critical were documentation of personal services, accounting for nonexpendable property purchased by grantees, the manner of payment for projects by federal agencies to the institutions, regulations for the protection of human subjects, and the effects of multiple agency regulations in the same area. The Paperwork Commission analyzed a 1976 survey by the National Association of College and University Business Officers (NACUBO) of universities heavily involved in sponsored programs. Of the fifty-three institutions which responded, thirty-seven identified the documentation of personal service charges, including cost sharing, as one of the most burdensome of the record-keeping requirements.

An Association of American Medical Colleges task force examined "administrative excesses" in federal programs and expressed particular concern with redundance in grant application requirements, the burden of manpower reports to one agency, the frequency of progress reporting, and the documentation of effort charged to sponsored agreements.[11]

Individual Correspondence

Much of the evidence regarding the burden of regulation is found in letters of protest. For example, an MIT professor has cited the burdensome paperwork involved in obtaining NIH approval for recombinant DNA research: he had to submit the required Memorandum of Understanding and Agreement to NIH thirty-five times in three years. (Recombinant DNA research review procedures have since been improved.) The regulations on research involving children and the institutionalized mentally disabled recently proposed by DHEW drew a large volume of protest from investigators, some of whom indicated that the regulations would actually force them to stop work because of the added layers of review and monitoring. Final regulations have not yet been issued.

Congressional Concern

In introducing a bill entitled "Health Science Promotion Act of 1979" (S.988) to the Senate Committee on Labor and Human Resources, Senator Kennedy[12] stated that his subcommittee had heard a chorus of complaints concerning the inefficiencies caused by reporting requirements now imposed by federal agencies:

No one disputes that the tax payer should be assured that his dollar is being appropriately utilized by the beneficiaries of Federal largesse. But at the same time, we must consider whether requirements aimed at assuring the accountability of expenditures are defeating the very purpose of those expenditures. We are told by some investigators that they now spend 25% of their time filling out forms and performing the various administrative chores necessary to keep their labs in operation. We hear of investigators spending 5-10% of their grant funds paying for the preparations necessary to justify their work to site visit teams from Federal research agencies. We see the sadness, anger and bitterness of many honest, well-intentioned, health researchers who feel that an atmosphere of distrust and hostility has developed between Federal agencies and researchers as a result of the tightening web of accountability requirements.

Adequacy of Evidence

The Commission believes that the evidence presented in this report is not necessarily decisive. A number of areas can be identified where careful analysis to supplement the available descriptive evidence would contribute to a better understanding of the problems. But the evidence presented herein is neither selective nor without weight. It represents only a sampling of the documents reviewed and the testimony received. A rigorous analytical approach would be expensive and difficult to undertake because the changes involved tend to be inherently difficult to measure and difficult to isolate. If such studies were deemed necessary in order to remedy the difficulties in the government-university relationship, both parties would have to be involved in planning them, and they would have to make some commitment to take responsible action based on their outcomes.

The Commission believes that adjustments to provide significant improvement in the relationship can be made without awaiting further study. In the following sections the conclusions and recommendations of the Commission are presented along with a proposed basic framework for the government-university relationship.

Conclusions

The Commission's review of issues about accountability yielded the following conclusions:

1. ***The research universities and the government are not working together as well as they should. Their relationship has been strained by accusation and distrust, affecting the atmosphere in which research is being done. The quality of the relationship must be restored.***

The government-university relationship is a complex and pluralistic composite of many individual relationships. The aggregate relationship is constantly evolving. The evolution over the last decade has involved a noticeable deterioration, the result of many factors and numerous incremental changes. Actions or omissions of both parties have contributed to this deterioration. While the problems are limited almost entirely to fiscal and administrative matters, the results affect research productivity. If continued movement in this direction is allowed, it would surely enfeeble the national effort in research. Research, science, and technology play key roles in solving the present problems facing the nation and the world. We cannot reduce the effectiveness of our national research program without jeopardizing our future.

Therefore, the purposes and public functions of the government-university research relationship must be reaffirmed. The trend toward adversarial positions has to be reversed. An atmosphere of mutual trust and confidence must be restored. To achieve these ends, both the universities and the government will have to change some of their attitudes and practices. Both will have to move simultaneously and cooperatively to improve their relationship.

2. ***The renewal of the government-university relationship should be based on principles and objectives which both partners understand and accept.***

Both the universities and the government must understand the means and the constraints which each uses to fulfill its responsibilities. The partners can take advantage of mutual interests and acknowledge common objectives, but they must also understand that research is not the sole concern of either. The different roles and independent objectives of the partners must be recognized.

Government officials should not lose sight of the advantages of having diverse and autonomous universities serve as a home of science. In turn, universities cannot be indifferent to the purposes of the government sponsorship of research. The serious responsibilities involved in the use of public funds demand scrupulous attention. The public has to be assured that considered decisions are made when investigators and research subjects are selected, that funds are spent for their stated purposes, and that adequate precautions are taken against fraud and waste.

Furthermore, the universities and the government have no time to lose in finding a satisfactory basis for continuing their partnership. The universities must assure the government that they have the resources and procedures to fulfill federal agreements. The government must recognize that there are well defined limits on its intervention into the policies and operations of the universities.

3. ***Because of the diversity of activities undertaken within the relationship and the diversity of the institutions and sponsoring agencies undertaking them, the activities must be governed primarily by mutually adopted principles, standards, or objectives, and not by detailed procedural requirements.***

A significant amount of the stress between the universities and the government is due to the failure by universities to provide documentation adequate to meet federally imposed procedural standards, rather than to imprudent decisions, illegal actions, abuse of resources, or fraud. The stress may be in the form of compliance, rather than in its substance. Perhaps the stress can be reduced by simplifying the requirements and procedures, while making clearer and more effective the principles underlying the requirements and the objectives being sought by the procedures.

4. ***The management and accountability procedures employed by the university and its research investigators must be consistent with both the terms of the specific research agreement and the academic environment. The nature and extent of federal constraints and involvement must also be tailored to the type of activity.***

Creative or exploratory activities are fundamentally different from production or development activities. Each requires a different approach for effective and nonintrusive accountability. A particularly supple approach is needed in the academic environment, where researchers perform multiple functions simultaneously and are accorded a high degree of independence in order to maximize their creativity. Forms of accountability which emphasize costing precision and detailed documentation, rather than judgments on the reasonableness of decisions, will have an adverse and potentially enervating effect on the efficiency, effectiveness, and enthusiasm of research performance.

5. *Academic institutions must regulate themselves more effectively, and the government must reduce its imposition of regulations to only those which are essential.*

Academic institutions must commit themselves aggressively to ethical behavior, skilled management, and quality of performance. These commitments must be addressed in ways consistent with the nature of the universities and their governance. While the ultimate responsibility in some of these matters must lie with individuals, the institutions must stimulate, facilitate, and reward individual responsibility. Institutions periodically must examine themselves to assure that their own management systems have sufficient controls, that they are operating as intended, and that dereliction in stewardship is promptly rectified.

Furthermore, universities have an obligation to consider how their activities affect the role, and the perception of the role, of the university in our society. The opportunism or irresponsibility of individual institutions or investigators can tarnish others by implication and can undermine the respect and confidence essential to a healthy set of relationships.

The government must recognize that the present burden of regulation strains the institutional capacity for compliance. Overregulation erodes institutional resources for productive work and demoralizes those whose dedication and inspiration are required for the advancement of knowledge. Most government regulations are designed to reduce or eliminate some form of risk. The key questions are the detail and the volume of these assurances, and how much risk can be reduced before the costs of further reductions significantly outweigh the associated benefits. At some point, the risks of overregulation become more serious than the risks the regulations are designed to address.

6. *An atmosphere of flexibility within an environment of reasonably stable fiscal support is essential for research to flourish.*

Inflexible controls and fiscal uncertainty have a decidedly negative impact on research performance and productivity, regardless of the nature of the research institution or performer. Stringent federal controls lead universities to impose restrictive institutional limits so that they can minimize the risk of cost disallowances. In this environment researchers act too cautiously and become wary of pursuing unexpected or unpredictable avenues of research. Present and future regulations should be assessed carefully for their impact on the flexibility conducive to research. Mechanisms for longer research commitments and for cushioning the termination of support also must be devised. An atmosphere of trust and confidence must be created to ensure the freedom investigators need to produce significant new results or ideas.

7. *The government and the university must recognize that current management technology is inadequate for some of the problems involved in accountability for research in academic settings.*

The management of large and complex institutions has become a profession and the subject of research. The main focus of managerial research has been on business and industry, which are hierarchical and production oriented organizations. Much less attention has been given to special managerial features and problems of nonprofit and public organizations, including government and the research universities.

To compensate for this inadequacy, the government and the university should explore alternative approaches to familiar problems, undertake pilot experiments in management of research, and stimulate research in disciplines which can themselves contribute to the resolution of the problems. Creative ideas for accountability in the university setting and for the research process are needed because the current systems have fundamental flaws. In particular, new approaches to effort reporting must be developed.

Principles and Objectives

The following section presents proposed principles underlying the conduct and support of research and proposed common research objectives of the Federal government and the universities.

The universities and the Federal government are each structured on principles which define their purposes and guide their actions. When there are differences between them over research policies and practices, the only acceptable solutions will be those which are compatible with the principles of both. Recognition and appreciation of these principles are, therefore, prerequisites for a good working relationship between them.

The following sections set forth two sets of principles: the principles held by the research universities and those held by the government. The universities' principles will appear obvious to persons in universities; the government's principles will be self-evident to those who work in government. Nevertheless, we have found that many university people do not know the government's principles or do not understand their importance to government officials and that, too often, government officials do not know or do not take seriously the principles of the universities.

Within the framework of the principles, broad objectives for the government-university relationship can be defined. These objectives may help the government and the universities to resolve some of the issues between them, and they may serve to guide the evolution of their relationship.

Fundamental Principles for the Research Universities

1. *The pursuit of new knowledge is one of the principal functions of a research university.*

The research university in the United States has become and should remain the principal center of fundamental research and scholarship. As a research center, it is an institution of unsurpassed performance, a model eagerly emulated by other societies.

2. *Freedom is essential to inquiry.*

The freedom of the scholar to pursue new knowledge wherever the paths of discovery may lead is essential to high achievement in research. This freedom is not absolute. It is limited in principle by moral and ethical constraints and, in practice, by the availability of resources. Imposing unneeded constraints weakens the spirit of inquiry, wastes talented minds, delays discovery, and hurtfully prolongs our ignorance.

3. *Research and teaching are inseparable.*

The search for new knowledge and the preservation and dissemination of established learning are interwoven in a research university; each makes an invaluable contribution to the other. Efforts to separate and distinguish them, whether for reasons of philosophical principle or administrative convenience, endanger the vitality of both.

4. *Diversity among research universities is a source of strength for the research program of the nation.*

Singly, each university provides strength in certain fields; together, the universities provide strength in all fields. The universities are diverse not only in the areas of strength, but also in their organization for research. The organizational differences derive partly from the decentralized way in which American higher education evolved and partly from research itself. Since research by its nature encounters the novel, the unknown, and the unexpected, universities naturally developed different approaches, practices, and structures for research. Such differences develop even within a single institution and are themselves a source of strength. Research universities which are dedicated to the discovery of the unknown should not be expected to be simple, monolithic, homogeneous, or administratively conventional.

Fundamental Principles for the Federal Government

1. *Government supports research in the national interest.*

The government supports the research and scholarship leading to new knowledge because of its responsibilities for the security and welfare of the nation. This principle has been stated explicitly in presidential, congressional,

and budgetary messages. In supporting research, the government is not bestowing gifts or favors on institutions or individuals. Rather, it is building and renewing public investment in an important public asset.

2. *Public support demands public accountability.*

The people and their representatives must have assurance that the national research enterprise yields results commensurate with the public resources invested and that the resources made available to it have been expended responsibly. The Congress supports research. The Executive agencies manage research. The investigators and institutions conduct research. All are broadly accountable to the people who make their work possible and who share in its benefits.

3. *Government in the United States is pluralistic.*

Federal and state governments are intentionally constructed to serve many constituencies. They have many branches and agencies, linked and separated in a variety of ways, and bound by checks and balances. While uniformity in policies and practices often exists and is often desirable, extensive uniformity would reduce the flexibility of the divisions and agencies. They need this flexibility to respond to the constituencies which they must serve.

Objectives for the Relationship

The Commission believes that the following objectives are consistent with the foregoing principles and can serve as a useful guide for the government-university relationship.

The government and the universities together should seek:

1. To maintain, strengthen, and support the competitive processes used to assure integrity, objectivity, and excellence in the pursuit of new knowledge. These include fair and rigorous use of review processes, full scientific accountability in the selection of research directions and programs, and critical evaluation and dissemination of research results.

2. To develop and strengthen the institutional and the human resources which will ensure progress in research, and to attend especially to the responsibility for educating new generations of scientists and scholars.

3. To provide for the productive integration of instruction and research, for the benefit of both and the society they serve.

4. To support and accommodate diversity in both government and the research universities, for the sake of the strengths their diversity brings.

5. To improve the associations between the government and universities, to make them both stable and supple.

6. To achieve informed general recognition of both the necessity for adequate accountability and the primary measure of accountability, namely value received for investment.

7. To make joint efforts to find productive and nonintrusive ways of providing accountability.

8. To recognize that both government and universities have other constituencies whose needs have to be balanced along with those arising from their association in research.

9. To recognize that both government and the universities should share equitably the responsibility of supporting the national research enterprise, each in its own way, using its resources prudently.

10. To establish and maintain the national research capability at the highest level, capable, if need be, of responding to a national emergency.

Recommendations

1. ***The Commission recommends that research universities and the government make vigorous, concerted efforts to overcome the mutual suspicions, ignorance, and misunderstandings which strain their relationship and weaken the nation's research enterprise.***

Despite the close government-university relationship existing for several decades, ignorance and misunderstanding about the nature, needs, and behavior of the partners are pervasive on each side. This undermines the efforts of government and university officers to resolve specific problems. Neither the government nor the universities assure that their people understand properly the complexities of the relationship.

The Commission offers the following suggestions for implementing its recommendation:

(a) Federal officials, university presidents, and other officers responsible for the research enterprise need to examine *together* the fundamental principles and issues of the government-university research relationship and the system in which it operates. University associations, such as the Association of American Universities, and appropriate government officials should work closely with each other to organize and facilitate such dialogue.

(b) The government and the universities should each provide basic information about the government-university relationship to all new personnel responsible for research support and management, including faculty. Brief, simple materials should list the basic principles of the government and the research universities and the objectives of their partnership; should outline the federal cost and management principles; and provide a guide to pertinent institutions, agencies, legislation, and regulations which outlines who is responsible for what, how, and when. These materials should be developed jointly by representatives of the government and the universities. Information specific to the institution or agency also should be included, and its bearing on the larger structure should be made clear. A commendable example of such materials is the textbook associated with the National Aeronautics and Space Administration's Seminar in University Project Management for Technical Officers.

(c) Both government agencies and universities should provide continuing education in research program management for their staffs and faculties. The objectives of such programs are awareness of the customs of and constraints on the different participants in the research process and improvement in management for research.

(d) It is important that faculty researchers be kept informed about federal developments relevant to research performance and management. One effective and economical way to do this would be to have an education association (e.g., the Council on Governmental Relations or the Association of American Universities) prepare a "syndicated column" or "news service" which could be disseminated via the weekly newsletter of the American Council on Education and published in campus newspapers. In brief, readable paragraphs, this service would provide notice of important developments with references to sources of more complete information.

(e) Educational and research management associations should explore ways to bring fundamental issues in government-university research relations into public forums for constructive discussion and debate. These should include Congress, the press, and national public radio and television.

2a. ***The Commission recommends that research universities and the government develop a new system for accountability tailored to the nature of the activity being sponsored and based on a set of minimum core requirements applicable to all research agreements. The core requirements would be sufficient for all basic research and for some applied research; further requirements would be added only for activities of a pronounced procurement character.***

Federally sponsored research in universities covers a wide range of activities. This includes generation of new knowledge in a general discipline or group of disciplines; research in a specific area targeted on federal objectives; development, testing, and demonstration; and manufacture or service characterized by provision of a specific product. The government-university relationship for these activities varies from a support (or assistance) mode to a procurement mode, but all the activities are currently burdened with a set of financial accountability requirements appropriate for *procurement* of specific, deliverable items. It is important to recognize that much of the university-based research does not need the hard edge of the procurement policies. Much of the university research will never be amenable to such requirements. The Commission suggests tailoring requirements to fit the nature of the activity, in order to protect the flexibility essential for productive research.

The Commission views the Grants and Cooperative Agreements Act (Public Law 95-224) as one starting point for evolving a better system for federal research support. In implementing the Act it will be very important not to overlook the influence of long-established agency traditions and attitudes about the type of agreement the agency uses to support research. (OMB solicited public comment on the draft working papers for a study, as mandated by the Act. The Commission submitted extensive comments on these working papers. Copies of these comments are available from the Commission.)

The proposed system of accountability would contain core requirements sufficient to avoid fraud and diversion from the purpose of the activity, broadly defined. These core requirements would be applicable to all research universities. As far as possible, they would be in the form of principles or standards rather than specific procedures. This form would allow for the diversity of the universities' organizational structures and accounting systems. These core requirements would be the only requirements for basic research and some applied research, whether or not the work is undertaken in support of a specific federal mission. Additional sets of requirements would be coupled with the core requirements when closer government oversight of scientific or fiscal matters is consistent with the nature of the activities and agreement.

The Commission recommends developing a very limited number of such additional sets of requirements. A larger number would exceed the administrative capacity of both the government and the universities. The selection of the particular set of requirements would be determined by the *nature* of the activity. It would not be determined by the title of the agreement (i.e., "grant," "cooperative agreement," or "contract") or other kinds of labels such as basic research, applied research, or mission-oriented research.

Detailed analyses of OMB Circular A-21 and its recent revision and OMB Circular A-110 were beyond the scope of this Commission. However, the Commission study of accountability problems led us to recognize that these cost and management principles do not provide the *optimal* principles for federally sponsored research agreements with universities. Although the principles provide important safeguards for both the government and the universities, some needs of each remain unmet. Some government representatives believe the principles provide inappropriate latitude and inadequate control against waste or abuse. University representatives believe the principles incorporate some requirements which are unproductive, intrusive and counterproductive, or out of proportion to the risk of federal funds. The Commission believes that these differences arise because the principles imperfectly accommodate the nature of the government, the nature of the universities, and the nature of the activity involved, and because there are significant differences in expectations regarding the purposes of the government-university research relationship. Therefore,

2b ***The Commission recommends that the Office of Management and Budget, in consultation with the federal agencies which sponsor research and the universities, revise the federal cost principles (Circular A-21) and the federal management principles (Circular A-110) as soon as possible, but certainly within three to five years. The revision should assure that these guidelines for financial and administrative accountability (1) incorporate features which not only control against abuse but also facilitate and encourage effective management, (2) are fully consistent with the nature of the research process, (3) accommodate better to the academic environment in which they must operate, and (4) are based on better mutual understanding of the purposes of the government-university research relationship.***

In the following paragraphs, the Commission makes several specific recommendations. Some of these will require adjustments in A-21 and A-110 requirements. These adjustments will relieve the current difficult situation, but they probably will not suffice. A thorough re-examination is needed, based on a recognition of the underlying operating principles of the government and universities, and the mutual objectives of their relationship.

3a. ***The Commission recommends, as a minimum, that the Office of Management and Budget institute new procedures to allow an opportunity for research funding agencies to comment on draft audit findings covering their university projects. This arrangement would be roughly parallel with current practices involving draft GAO management audit reports, and would provide relevant information for the audit agency.***

3b. ***In addition to the above review, the Commission recommends, as an optimum, that agency program officers supplement their review of final scientific reports with advisory observations concerning the reasonableness, from a research standpoint, of the expenditures for personnel. The records of sponsoring agencies subsequently would be useful for the independent financial audits. This would link the technical review and the financial audit, an important linkage now missing.***

The Commission understands and supports the importance of the independent financial audit in public management. The Commission has observed that a major cause of stress in the government-university research relationship is the extent to which auditing and research program management are separated. Therefore, the Commission has sought better arrangements to narrow the separation without either compromising the independence of the audit or subordinating research management responsibility to the fiscal audit.

The Commission notes that the present system of scientific accountability, which relies heavily on the effectiveness of the selection process, seems to work very well. The competition for initial and renewed support focuses considerable emphasis on the productivity and significance of previous research. Only those investigators who do not immediately seek additional support escape this assessment of their work. Evaluation of the productivity of research projects separate from that involved in the selection process would be difficult, costly, and draining on limited research resources. A preferable approach would be periodic evaluation of the productivity of a sample of research activities as a test of the efficacy of the selection system.

The Commission proposes that the federal agency program officers accept responsibility, in the course of their appraisal of progress or final scientific reports by investigators, for documenting their views on the reasonableness of deviations from originally planned research protocols and expenditures for personnel. Independent post audits, which normally occur long after the completion of the project, would take into account such information at its full value. In this way, the auditor would have the benefit of both the programmatic appraisal of the investigator's work and a timely judgment by the technical officers as to the context of applied effort and variances from proposed research patterns.

The Commission recognizes that this review would be costly and might not be feasible with current program officer staffing. For this reason, it proposes, *as a minimum*, introduction of new procedures to provide for research funding agencies to comment on draft audit findings covering university projects they have sponsored. This provision would help assure that at least some input from those best able to determine scientific accountability would be made available for use in the ultimate audit resolution.

4. *The Commission recommends a simpler and less costly method of effort reporting based on responsible self-regulation: the explicit certification by individual investigators that direct salary charges to their research agreements are reasonable and fair, coupled with the federal program officer's review of the reasonableness of these expenditures for the work undertaken.*

The Commission has given special attention to the recurring disagreements about documentation for salaries and wages charged to federally sponsored agreements. Recommendation 4 deals with direct costs; recommendation 5 will deal with indirect costs. The government standard has been the industrial model of frequent time or effort reporting on an after-the-fact basis. As the magnitude of funds involved has increased, the government has sought more comprehensive and more detailed reports. Although the new federal cost principles in OMB Circular A-21 state that "reasonable accurate approximations" are sought, they require documentation of any apparent change in effort distribution, whether or not that change is significant.

Universities, however, operate on a work assignment basis. Hours worked or effort expended are not used as performance measures for professorial or professional personnel. There is not, nor should there be, a standard work week for these individuals. The activity of professional personnel in universities has a complex, multipurpose, joint-product character. The level of precision implied by the federal reporting requirements exceeds what can honestly and usefully be accomplished.

Ironically, the same characteristics of universities which fit poorly with the industrial model of effort reporting are essential for the special contributions universities make to the nation's research enterprise. Unfortunately these characteristics also lead to concern about accountability for public funds. If faculty activity simultaneously serves multiple functions where the government may have unequal interests, it is difficult for the government to assure that it only reimburses its fair share. It is also difficult to avoid over-recovery, intentional or unintentional. The recent struggle to revise the federal cost principles applicable to colleges and universities was largely driven by the desire of both the government and the universities to find satisfactory answers to these questions. Unfortunately, the revised cost principles still are not satisfactory.

A simpler and less costly method is needed. The new method should both fit the nature of the research organizations and provide accountability for public funds. To this end, the Commission recommends a new approach for documentation of direct salary charges. In lieu of effort reporting, the documentation would consist simply of (1) the report by the university of the salaries charged to the sponsored agreement; (2) the explicit certification by the investigator that the direct expenditures for salaries and wages are fair in terms of the research agreement; and (3) the assessment by the federal program officer of the reasonableness of these expenditures for

the work undertaken. The program officer's acceptance of the reasonableness of these expenditures would constitute the formal determination of their allowability. Periodic audit of the institution's payroll system would be undertaken by federal auditors or independent auditors to assure that the system has adequate controls against fraud.

This approach reflects the actual work assignment process, uses information from those most knowledgeable, provides for checks and balances within the institution, and provides for independent audit of the payroll system. It would actually improve accountability, since it provides for consideration by the government of reasonableness of salaries charged in terms of work undertaken.

5. The Commission recommends that government agencies and universities jointly construct an option, analogous to the "standard deduction" in income tax calculation, to charge activity which is treated as indirect costs under sponsored agreements. The fixed percentage would be negotiated. It might either be uniform or vary from institution to institution. Some universities would not receive full credit for their allowable indirect costs. However, accountability would be fully served and both government and universities would reduce the burden of detailed accounting and audit.

Faculty effort devoted to activities charged as indirect costs, such as departmental administration and research administration, is especially difficult to document. This effort tends to be a relatively small percentage of an individual's total assignment, it is usually intermittent, and it may fluctuate throughout the year. However, the annual and institutional aggregate of such faculty effort is sizeable. The extent of faculty engagement in such activity is heavily influenced by the organizational details and philosophy of the particular institution. The cost of such activity is likely to vary among institutions, but may vary little from year to year for the same institution.

The current and revised cost principles already provide an option for "small" institutions, those with less than $3 million per year in federally sponsored project funds, to select a simplified general procedure for calculation of indirect costs. The Commission is recommending introduction of another option by which any institution could elect a modest fixed percentage recovery for the indirect cost component for faculty administrative work allocable to organized research. This fixed percentage charge would be used in lieu of full recovery based on full documentation and would allow some simplification of the present burdensome documentation requirements. Such an approach would be analogous to the option to use either the standard deduction or documented itemized deductions in income tax calculations. It would remove a source of recurring stress in the government-university relationship.

The setting of the fixed indirect cost rate should provide fair compensation and assure that the cost to the government would not exceed actual allowable costs. While a standard fixed rate, applicable for all institutions which elect the option, would be the simplest to administer, it may be necessary to provide for individual negotiations to set the fixed rate in an equitable manner. If the latter were the case, the fixed rate should be set for multi-year periods. Whether or not to use the fixed rate option should be the choice of the institution.

When coupled with the simplified approach for documenting salaries charged as direct costs (see Recommendation 4), the "standard deduction" option would provide good accountability. It would use methods more appropriate to the research environment and less costly for both the government and the universities.

The "standard deduction" option also could be used in conjunction with other methods of documenting salaries charged as direct costs. If it were employed with the monitored workload method given in the revised Circular A-21, that method would become a real option for many institutions which now find it unworkable to project workload assignments for indirect cost activities for faculty.

6. The Commission recommends that university presidents review their financial management systems. Universities should invest sufficient resources to ensure adequate control and accounting for the expenditure of research funds. These systems must provide timely and accurate financial information necessary for effective research management by research investigators. In turn, research investigators must meet the responsibilities and obligations which accompany their use of public funds.

In making this recommendation, the Commission is stating the obvious. Some universities have not adequately adapted their financial management systems to accommodate all the special requirements imposed by the use of public funds. One aspect is most often addressed inadequately. This is the timely and accurate financial information necessary to university researchers for prudent management of research programs. Without such information other accountability problems inevitably follow.

In universities the individual researcher has the primary operational responsibility for both the scientific and fiscal project management of federally sponsored research. The universities must ensure that their researchers recognize and meet this responsibility and therefore must provide them with the management information they need to do so, e.g., current expenditure and cost encumbrance information.

Most universities have tried to shield their researchers as much as possible from the burdens of administrative work. However, given the project system of support, such insulation actually can undermine the researchers' ability to carry out their operational responsibilities. A new balance must be struck to promote more informed and effective collaboration between researchers and administrators in universities. This will be fostered by improved federal accountability requirements which are productive and appropriate to the research process and the organizational environment.

7. ***The Commission recommends that the government and universities develop revised financial and scientific accountability processes which increase the flexibility and incentives for investigators to manage research funds in a scientifically prudent manner.***

The Commission has become convinced that improved accountability for public funds will not emerge from imposition of tighter controls no matter how rigorously they are enforced, and that such an approach will exacerbate the present problems. This approach would result in large part from a combination of ill-fitting, unproductive, and excessive requirements, suspicion and distrust growing out of different perspectives and expectations regarding the government-university relationship, and an accumulation of regulations to the point of overloading the institutions' capacity to respond.

The present rules erect artificial and unnecessary barriers to resource sharing, economy measures, and re-budgeting to respond to research or management opportunities. Mechanisms for increasing the flexibility of investigators to manage the resources should be provided. With more flexible arrangements, investigators can amplify the purchasing power of their funds and take proper advantage of unanticipated leads in their research. Without flexible arrangements the creativity and innovation for which the funds are provided is impeded.

The Commission applauds the flexibility provided many years ago by the pioneering work of the NIH in delegating certain prior approval authority to grantee institutions and more recently by the NSF in its experiment in post-award administration. The Commission believes that these approaches should be expanded in scope and adopted by other agencies. Recommendations 8 through 10 suggest how these objectives can be accomplished.

This recommendation for increased flexibility is purposely directed at both the government and the universities. Some institutions are overly cautious in their responses to federal requirements, while others must contend with state regulations that are complex and also may conflict with the federal regulations. The result can be institutional interference with research not required by the federal provisions. The Commission urges all institutions to examine the necessity of their own restraints on the flexibility of the investigator.

8. ***The Commission recommends that agencies delegate to the universities more authority to make budgeting and management decisions under sponsored agreements.***

During the period of a sponsored agreement, changes in the original budget or management plans may become necessary. For most agencies, certain changes require the written prior approval of the agency. Such approval is almost always forthcoming, but the approval process introduces delays and paperwork. Delegation of the authority to give prior approval to an Institutional Prior Approval System (as NIH and NSF have done for certain changes) makes the university responsible for enforcing the government requirements using the government's criteria for making the decision. Such delegation places the responsibility in the hands of those who have the information for prudent judgments and reduces both paperwork and delays in obtaining decisions.

The key elements in an Institutional Prior Approval System (IPAS) are:

(a) Local decision-making structures tailored to the particular institution and designed to preclude conflict of interest. Normally, an institution would develop a single, campus-wide IPAS system, but situations may arise where a separate system might be necessary to meet the needs of a portion of a campus. Different institutions and different campuses within the same institution will probably develop different systems. All systems will provide for the project director's approval and independent review of propriety and allowability for the decisions involved.

(b) Accreditation of an individual institution's prior approval system by a single federal agency so that the system need not be reviewed separately by all the agencies which have sponsored agreements with the institution.

(c) Delegation of the same decision items by all participating agencies, such as acquisition of special purpose equipment costing more than $1,000, rebudgeting of equipment or travel beyond the limitations presently imposed, no-cost extensions of contractual periods, and the pre-award costs described in Recommendation 10 below.

(d) Reservation by the government of prior approval authority for

—change in project director;
—significant change in project director's level of effort;
—significant change in scope of work;
—change in the Institutional Prior Approval System itself.

These reservations, together with overall cost limitations, protect agency control over major budget elements.

(e) Documentation of decisions made within the Institutional Prior Approval System, including certification that the prescribed criteria have been considered by authorized individuals.

(f) Provision of information about delegated decisions to the funding agency program manager.

(g) Periodic audit of the institution's compliance with the charter of its accredited prior approval system.

The establishment of an IPAS in any university will of course require the approval and agreement of both the government and the university. A university which seeks approval of an IPAS must be free to design a system to suit its own structure and needs, but the government must be convinced that the proposed design will provide the necessary accountability. It must be understood by the university and its researchers that the benefits of an IPAS can be obtained only at the cost of assuming the burden of the responsibility it entails, and that the performance of the system is subject to government review and audit.

Widespread use of Institutional Prior Approval Systems will increase the productivity of government research funds and will reduce the administrative work of sponsoring agencies. The IPAS is not a new approach. The NIH system of limited delegation of prior approval authority has operated successfully for about fifteen years. The current NSF experiment with greater delegation has been judged highly successful in its preliminary evaluation. The Commission is recommending the expansion of a concept which has already been tried. Over time, widespread and successful operation of such systems should lead to expanded responsibility and flexibility for the universities, with greater accountability, productivity, and cost savings for both sponsoring agencies and universities.

9. *The Commission recommends that Congress authorize and agencies develop arrangements for aggregating individual research projects for administrative purposes.*

Related research programs funded under several agreements or by several federal agencies need arrangements for post-award aggregation of their administration. This also would streamline the administration of multiple awards from the same agency to investigators in a single department or other university unit. The narrow focus of many individual research agreements has introduced unnecessary barriers to good management and has created cost transfer problems. Aggregation for post-award administration would (a) facilitate effective use of funds by reducing the necessity of cost transfers among related projects; (b) allow efficient pooling of resources; (c) eliminate the pressure for end-of-year spending associated with one-year continuing grants; and (d) simplify effort reporting for individuals whose projects are contained within the aggregate.

Aggregated awards would allow for both scientific and financial accountability. Aggregation would not jeopardize the control by the individual investigator, because the project director must approve movement of funds from a project within the aggregate. Scientific reporting would be done as it is now, with each investigator responsible to report to the sponsoring agency on each award received. The integrity of congressional authorizations and appropriations is carefully maintained, because aggregation is post-award and scientific reporting is maintained on a project basis.

The administrative efficiencies of aggregated arrangements would benefit investigators, universities, and the government. The strong incentives investigators have for controlling the resources they have developed, and the institution's authorized prior approval system (described in Recommendation 8), provide the checks and balances necessary for ensuring that the sponsoring agency's intent is preserved.

It should be noted that some efforts toward aggregation already are being made, e.g., the mechanisms provided by the Joint Funding Simplification Act and the recent NSF Master Grant Experiment with selected chemistry departments.

10. ***The Commission recommends that government agencies improve the management of research funds by eliminating unnecessary constraints on the timing of expenditures. Specifically, the Commission recommends institutional authorization for pre-award expenditures up to 90 days prior to the effective date of awards and for carry-over of surpluses or deficits to the following contractual period, at least up to a specified percentage of the total award for that period. This involves no risk or commitment by the sponsoring agency.***

Expenditures incurred prior to the effective date of an award or beyond its expiration date are not usually allowable. These restrictions assume that research can be forced to operate within an annual cycle. They underestimate both the likelihood of uncertainty and the importance of stability and continuity in the research process.

The Commission recommends delegation to the institution of the authority to approve expenditures which are beneficial to the research up to ninety days before the effective date of the award. This provision would facilitate equipment ordering and recruitment of personnel for new projects and would enable continuing projects to proceed without interruption. The provision will require some risk management by the universities, because the awards they anticipate receiving sometimes are not finally funded.

The Commission also recommends that project directors be permitted to carry over surpluses (or deficits) to the following contractual periods, at least up to a percentage ceiling. This provision would eliminate some of the impetus for cost transfers, reduce inefficient expenditure patterns, and reduce administrative costs. Tight budgets and future uncertainties now force investigators to choose among artificially narrow options when research directions change, when unexpected delays yield a balance at the end of a budget period, or when an award is delayed. Limiting carry-overs to a fixed percentage of overall expenditures will provide safeguards for the government while allowing needed flexibility for research.

11. ***The Commission recommends that Congress, the agencies, and the universities assure that the processes of accountability themselves meet the tests of accountability. The processes should yield results which justify their cost. One important application of this principle would be the elimination of the documentation now required by legislated cost-sharing on research grants.***

The practice of accountability is not free. The universities and the government are both prepared to pay for sound accountability practices. Where there is little or no return for the accountability effort, those accountability requirements should be set aside for they drain both energy and resources from the research staff. The distinction between fitting and gratuitous requirements can be a difficult matter of judgment, involving careful consideration of the balance between the cost and the benefits of the requirements.

A clear-cut example of a gratuitous requirement is documentation of legislatively mandated cost-sharing in research grants to universities. Universities bear a significant part of the cost of basic research in this country, because they accept research as one of their principal functions. For their own purposes they have little or no need to budget or account separately for such activities. Specific documentation of the cost-sharing now required by statute for research grants has virtually no effect on the amount of research support the institutions provide. The documentation does impose a costly paperwork burden on the institutions while exacerbating the effort reporting problem by adding another category of faculty member effort.

Despite recommendations to eliminate the general cost-sharing requirement by the Government Procurement Commission, by the Interagency Task Force which studied the recommendations of the Procurement Commission, and by the Federal Paperwork Commission, the requirement remains in force. The time has come to rescind it.

Another example of nonproductive documentation is the current effort reporting methods which are discussed above along with proposed alternative methods under Recommendations 4 and 5. These methods require detailed documentation of personnel activity distributed into numerous categories and documentation of any apparent change in effort distribution, whether or not the change is significant. Such requirements ignore the essential interrelatedness of the activities and overlook considerations of materiality. They demand a precision which exceeds what honestly can be provided. They defeat the purpose of accountability.

Toward Improvements: An Evolution

In the course of its study on accountability, the Commission received information and views from scores of persons in government and in the research universities. Some general observations and reflections arose from our experiences in addressing these matters. These observations are:

1. The difficulties between the universities and the government over accountability, and over other issues as well, have not appeared overnight. Nor is it likely that they can be caused to disappear in a short time.
2. Since the government-university relationship is an important national resource, its evolution is perhaps too critical a matter for a laissez-faire approach.
3. The Commission's relatively broad-based membership and freedom from institutional obligations has broadened the perspective and increased the objectivity of each member. In its deliberations the Commission often felt the need for participation of more representatives of the government as members. This was despite the generous contributions of time and thought which government officials gave to the Commission through testimony and consultation.
4. The Commission's isolation from day-to-day controversies between the universities and the government was an advantage in its work.

The Commission believes that there is a gap between the government and the universities. This requires a bridging process whereby the concerned parties can see the relationship *as a whole*, and guide its evolution in directions that assure its strength and vitality. Although the Commission has not yet settled on a solution, we offer for discussion the following preliminary suggestion:

> **The creation, as an experiment for five years, of a new, independent Forum whose purpose would be to watch over the government-university research relationship and to guide its evolution.**

Such a Forum should provide a non-adversarial setting. Here persons from the public, Congress, universities, and federal agencies would address the major policy issues and problems in the research associations between the universities and the government. They would derive effective responses in terms of the objectives of the relationship and its overall role in the national research enterprise.

Such a Forum should not be a debating society. Nor should it be a substitute for the organizations which deal with the day-to-day problems in the government's sponsorship of research in universities.

If convened by a highly respected non-governmental or quasi-governmental organization, or by a private foundation with a strong interest in the national research enterprise, perhaps such a Forum could accomplish what present structures have been unable to do.

Appendix I: References

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Appendix II: Sources

The Commission is indebted to the many persons who have provided information and advice, and it wishes to acknowledge its appreciation for their efforts. Invited expert witnesses have testified on the issues within the Commission's purview at its monthly meetings; open hearings have been held on four university campuses; subcommittees have met with individuals and groups from the Federal government; and members and staff have attended or made presentations at meetings and hearings convened by educational associations, government agencies, and Congress.

Witnesses. The following individuals presented views and gave assistance in the development of this document. The Commission wishes to emphasize that the views in this document are its own and not necessarily those of the listed individuals. This list includes meetings through January 1980.

Richard Atkinson, Director, National Science Foundation
Donald L. Ball, Air Force Office of Scientific Research
Robert Barlow, Cornell University
Robert M. Bock, University of Wisconsin
Howard W. Bremer, University of Wisconsin
Newton Cattell, Association of American Universities
Honorable Lawton Chiles, U.S. Senator from Florida
Robert Coakley, U.S. Senate Subcommittee on Federal Spending Practices and Open Government
Camden Coberly, University of Wisconsin
Stephen Cole, State University of New York Stony Brook
Tom Collins, University of California, Los Angeles
Theodore Cooper, Cornell University
Lawrence G. Crowley, Stanford University
Robert Cutler, National Science Foundation
John M. Deutch, Under Secretary, Department of Energy
Sidney Drell, Stanford Linear Accelerator Center
Marvin E. Ebel, University of Wisconsin
Gretchen Engquist, U.S. Senate Subcommittee on Health and Scientific Research
Kristine Forsberg, Department of Energy
Osmund Fundingsland, General Accounting Office
George Gamota, Department of Defense
William Gibb, U.S. Senate Committee on Commerce, Science and Transportation
Howard Gobstein, General Accounting Office
Delphis C. Goldberg, U.S. House of Representatives Subcommittee on Intergovernmental Relations and Human Resources
Milton Goldberg, Council on Governmental Relations, National Association of College and University Business Officers
Art Heming, National Institute of General Medical Sciences
Robert W. Hougas, University of Wisconsin
William Kays, Stanford University
Bryant Kearl, University of Wisconsin
Thomas J. Kennedy, Jr., Association of American Medical Colleges
Charles V. Kidd, George Washington University

Richard M. Knapp, Association of American Medical Colleges

Philip Kropatkin, Deputy Director, Audit Agency, Department of Health, Education, and Welfare

Sanford Lakoff, University of California, San Diego

John Lordan, Office of Management and Budget

Reuben Lorenz, University of Wisconsin

Hugh Loweth, Office of Management and Budget

David Mears, University of California System

George Millburn, Department of Defense

Bryan Mitchell, Assistant Inspector General, Department of Health, Education, and Welfare

Thomas Morgan, Association of American Medical Colleges

Morton Myers, General Accounting Office

Robert Newton, National Science Foundation

Tom O'Brien, National Eye Institute

Gilbert S. Omenn, Office of Science and Technology Policy

George Pake, Xerox Corporation

J. Thomas Parmeter, Michigan State University

James Pike, National Heart, Lung, and Blood Institute

George Pilarinos, National Aeronautics and Space Administration and National Science Foundation

Dennis Prager, Office of Science and Technology Policy

Simon Ramo, TRW, Inc.

William F. Raub, National Institutes of Health

Jerold Roschwalb, National Association of State Universities and Land-Grant Colleges

Halsey L. Royden, Stanford University

Robert Ryan, Office of Naval Research

Steven Schiaffino, National Institutes of Health

Helen Schroeder, National Institutes of Health

Reagan Scurlock, Council on Governmental Relations, National Association of College and University Business Officers

Richard Sessions, University of California, Los Angeles

Irving Shain, University of Wisconsin

Paul Sitton, National Academy of Sciences

Donald Speer, National Science Foundation

Elmer B. Staats, Comptroller General of the United States

Richard E. Stephens, Department of Energy

Eldon Taylor, Inspector General, National Aeronautics and Space Administration

Thomas van der Voort, U.S. Senate Committee on Appropriations

Len Van Ess, University of Wisconsin

David Wilson, University of California System

Raymond Woodrow, formerly with Princeton University

Richard G. Woods, Office of the Honorable Henry L. Bellmon, U.S. Senate

Edwin Young, University of Wisconsin

Agency Liaison. These persons have been appointed by their agencies:

Salvatore Cianci, Alcohol, Drug Abuse, and Mental Health Administration
George P. Millburn, Department of Defense
Richard E. Stephens, Department of Energy
Osmund Fundingsland, General Accounting Office
Walton Francis, Department of Health, Education, and Welfare
James R. Lawson, National Aeronautics and Space Administration
William F. Raub, National Institutes of Health
Jack Sanderson, National Science Foundation
Eliot R. Cutler, Office of Management and Budget
Philip M. Smith, Office of Science and Technology Policy.

Open Hearings. Some sixty persons testified before the Commission during hearings at the national conference of the American Association for the Advancement of Science and on the campuses of the University of Alabama, Birmingham; California Institute of Technology; Stanford University; and the University of Wisconsin, Madison.

The Commission especially wants to acknowledge the contributions of the fifty-eight persons who reviewed a draft of this manuscript on a confidential basis.